

**Radiation****Safety**

Minutes of RSC Subcommittee of October 10, 2013

**Committee****Subject: Review of the New ACS Status for the Linac and the Request to Remove the NSRL Berm Chipmunk (NMON130)**

**Present:** D. Beavis, J. Reich, R. Karol, A. Etkin, N. Kling, B. Van Kuik, C. Pearson, C. Schaefer, H. Kahnhauser, C. Montag, D. Raparia, B. Briscoe, V. Lodestro, and C. Theisen

**Linac PLC Access Control System (ACS)**

The committee reviewed the installed PLC system at the Linac with the expectations described in the RSC Minutes for the design. The recommendations in the minutes were checked against the system status and design. Any deviations were discussed and recommendations made if they were not considered acceptable.

The hardware has been installed. The system is finishing the V&V process and will undergo the functional tests. The initial discussion had the tanks being conditioned under the old ACS to meet schedule for protons to NSRL. In the meantime the decision was made to get protons from the Tandem and therefore the RF conditioning in the future will be conducted under the new RF system. The items 691 and 692 are closed. The checking on the life cycle was not done but was closed with concurrence of the Chief Mechanical and Electrical Engineers.

The beam optics do not allow the LEBT beam stop to be relocated and thus item 694 was closed. The A Division PLC system controls and monitors tank 1, 50Kv Power Supply Contactor. The Kirk key is no longer used. This closes item 695.

**FROM STATE TABLE-----**When in Access modes 2, 5, 8, 16. The LINAC Tank RF Master Timing Signal Relays LTRFMTR shall be disabled to interrupt the Tank RF master timing pulse, which will prevent tank RF pulsing. When in the various access modes, the 50kV contactors shall be disabled if RF pulsing is detected by the LINAC Tank RF Pulsing Detector Circuit (LTRFPDC). A Division shall monitor the LTRFPDC via analog input modules. Typical count range seen by A division PLC when actual RF pulsing is on is 400-600 counts/pulse out of a total of 10,000 counts=10VDC. When RF

pulsing is off A division typically sees 0-25 counts of noise signals. Tank RF shall be considered pulsing when counts are  $\geq 50$ .

In RF NA mode the pulsing will be disabled when either Tank 1 or Tank 9 gates open. A preliminary draft of the state tables<sup>1</sup> for the ACS logic is being reviewed.

The analysis of the beam stops for water cooling etc was conducted more than 20 years ago. It was requested that a **re-examination of the water cooling not in the PLC system be conducted in terms of personnel safety. Ensure any needed device protection has been moved to another system such as the FBI (Fast Beam Interrupt) .(ATS-LINAC-Nov. 15, 2013, Beavis&Tuozzolo)**

This ATS item replaces item 697 and 698 (thus closed) and 696 is closed.

The BLIP spur will now be controlled by a locked gate with a CAT-24 key. The sweep procedure needs to be modified to account for the tamper wire and reviewed before item 699 can be closed.

Access to a crash cord or button was not provided in the BLIP spur. It will be reviewed whether this is acceptable. Item 700 will be closed if C. Schafer and D. Beavis agree that it meets the requirements of the SBMS and 10CFR835 and departmental guidelines. Otherwise access to a crash station will need to be added. After the meeting there were several e-mail exchanges and the decision was to close this item and not require a crash button. Item 700 is closed.

If a sensor on a gate detects that the gate is open then the PLC system drops the sweep for each side of the gate. The exception is the plug door swing gate. This gate is behind the inside the plug door and intended for non-beam operations and does not drop the sweep.

The no-man's zone between the AGS and HEBT will remain swept as long as the defining gates are not opened. Item 701 closed. Item 702 is closed. The radiation detectors in the pump house were not installed as independent detectors. **Check if independence is required for the two pump house chipmunks. (ATS-Linac-Nov. 15, 2012-Beavis&Karol)**

The state tables are out for review and the signing of the wiring diagrams will be started soon. It will be checked with QA if the signing of the Linac wiring prints can follow the same methods for signing as used for the AGS PLC system. The number of drawings is sufficiently small that after the meeting it was decided that each drawing will be signed by the appropriate individuals.

Item 703 and the items in the implementation plans section are closed. The AGS fire and subsequence rebuilding of the AGS ACS with PLCs was done and covered the issues related to these items. It was noted that the "stone" needs to be open if the Linac is placed on restricted access as part of emergency egress.

Close 703-708.

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<sup>1</sup> Preliminary Draft "[Linac state tables rev A 10 15 2103](#)"

## **NSRL Berm Chipmunk (NMON130)**

The committee discussed the information and analysis provided in the memorandum<sup>2</sup> on the purpose of the chipmunk on the berm. The committee agrees that the only function of the berm chipmunk is to limit the potential dose to personnel outside the NSRL berm fence in the event that high intensity protons are delivered into the NSRL beam line. If the Booster is operating in a fashion that high intensity protons are not a risk into NSRL then the chipmunk does not have to be functional. The committee notes that the chipmunk can protect against inadvertent dose if it located on the outside of the berm fence.

The committee members that are from operations noted several potential issues that should be addressed before a decision is made to remove the chipmunk. The first issue is to address the linearity of the NSRL ion chamber and the Booster ring transformer to ensure that they will provide the alarms that are discussed in reference 2. The transformer is designed to operate at both high and low intensities. The electronics have gain switches that are used for the different intensity ranges. The impact of these setting on the alarms to operators of high intensity beam into NSRL should be examined. The ion chamber needs to be examined for possible saturation effects on the output signal.

The second issue is establishing the risk for large proton intensities to be transported into the Booster. The means to switch from the polarized proton source to the high intensity source has evolved over time and become more convenient for operations. It was noted that during the switchover between sources there have been times when large pulses of protons are transported into the Booster. It was not clear how large these pulses were and with what efficiency the protons were accelerated.

The committee can not recommend the removal of the chipmunk until these two issues are addressed and the risk is better determined.

The committee recommends:

**ATS-Linac-Pearson&Beavis-Dec. 01, 2013**→ Move the chipmunk to outside the fence on the west side of the NSRL beam without impacting NSRL operations.

The chipmunk can be eliminated or removed from the interlocks provided the following two items are successfully closed.

**ATS-Linac-Beavis&Van Kuik-Dec. 01, 2013**→ Review the process to switch between the proton sources and reduce the risk of large pulses.

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<sup>2</sup> D. Beavis, “Chipmunk on NSRL Berm Top and Maximum Possible exposure at the fence”, Oct. 4, 2013; [http://www.c-ad.bnl.gov/esfd/RSC/Memos/NSRL\\_10\\_4\\_13.pdf](http://www.c-ad.bnl.gov/esfd/RSC/Memos/NSRL_10_4_13.pdf)

**ATS-Booster-Rusek&Kling-Dec. 01, 2013**→ Review the instrumentation in the Booster and NSRL to alarm operators on large intensities in NSRL.

**CC:**

Present

RSC

RSC Minutes file

D. Passarello

T. Blydenburgh

A. Rusek